

Chapter 8.9

Aquatic non-native and invasive species in the Maryland Coastal Bays

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Abstract

Exotic or non-native species can become invasive when they are introduced in areas where they lack predators or other natural controls on their populations. They can take over food or habitat used by native species and thus displace the native species. A variety of exotic species have been found in the Coastal Bays, particularly near man-made structures. Three inter-tidal, marine invasive species have been documented: the Asian Shore Crab, (*Hemigrapsus sanguineus*), the European Green Crab, (*Carcinus maenas*), and Deadman's Fingers Macroalgae, (*Codium fragile*). All were found predominantly in association with rocky, riprap substratum, and five of eight Bays hosted one or more of these species. No invasive species were documented in Newport Bay (one site surveyed), Assawoman Bay (five sites) or Little Assawoman Bay in Delaware (three sites).

Introduction

Non-native species and invasive species are exotic species that when introduced to an area may grow uncontrollably, thus displacing native species and decreasing habitat value for native plants and animals. Currently, phragmites, mute swans, nutria, green crabs and the Pacific Shore crab are known to exist in the Coastal Bays.

This report summarizes the findings of "Assessment of Invasive Species in the Coastal Bays of Delaware and Maryland," a project supported by a grant from the Maryland Coastal Bays and the Delaware's Center for the Inland Bays National Estuary Programs. The goal of this project was to provide a comprehensive assessment of invasive species in the Coastal Bays of Maryland and the Inland Bays of Delaware. In all, 59 intertidal surveys have been conducted at 38 separate sites (Figure 8.9.1). From October 2002 through December 2003, surveys were conducted of the intertidal shoreline in all eight coastal and inland bays: Assawoman, Isle of Wight, Sinepuxent, Newport, and Chincoteague Bays in Maryland, and Rehoboth, Indian River and Little Assawoman Bays in Delaware. Sites throughout the bays were chosen to include ecological reserves and state parks as well as invasion "hot spots" such as disturbed / dredge areas, marinas, inlets and other potential points of entry.

Management Objective: Reduce and control invasive/ exotic species.

Indicator: Percent non-native species**Analyses**

At each site, species present were recorded (collecting specimens for laboratory identification and vouchers), temperature, salinity, shoreline and substratum type, and vegetation type. Each site was located with GPS coordinates and photographed to document habitat type. Close-up photographs were taken to show invasive or otherwise notable species in their natural habitat.

Status of intertidal invasive species

Three intertidal, marine invasive species have been documented: the Asian shore crab, *Hemigrapsus sanguineus* (Figure 8.9.2), the European Green Crab *Carcinus maenas* (Figure 8.9.3), and Deadman's Fingers Algae, *Codium fragile* (Figure 8.9.4). All were found dominantly in association with rocky, riprap substratum, and 5 of 8 bays hosted one of more of these species (Table 8.9.1). No invasive species were documented in Newport (1 site surveyed), Assawoman (5 sites) and Little Assawoman Bays (3 sites).

Table 8.9.1 Percent occurrence of three intertidal, marine invasive species at survey locations.

Location	% with riprap shoreline sites	% with indicated invasive species		
		Asian shore crab <i>Hemigrapsus sanguineus</i>	Deadman's Fingers Algae <i>Codium fragile</i>	European Green Crab <i>Carcinus maenas</i>
Survey sites (n=38)	55% (21/38)	42% (16/38)	24% (9/38)	13% (5/38)
Bays (n=8)	100%	63% (5/8)	50% (4/8)	25% (2/8)

Hemigrapsus sanguineus and *Codium fragile* (Figures 8.9.2 and 8.9.3) were found broadly throughout the area, while the distribution of *Carcinus maenas* (Figure 8.9.4) was more restricted to the Indian River and Ocean City inlet areas.

Summary

None of the three intertidal species was found in association with vegetated, salt marsh shoreline. In contrast, artificial rock or riprap shoreline commonly hosted one or more of the three invasive species. Invasive species were found in all seasons sampled. MD DNR Fisheries have also found juvenile green crabs associated with *Fucus* (Rockweed) growing on the water edges of marshes near the inlet. While our survey did not quantify

abundance, *Hemigrapsus sanguineus* was clearly the most abundant and **ecologically** dominant species in rocky intertidal in the Coastal Bays.

The abundance and dominance of *Hemigrapsus sanguineus* in the rocky intertidal zone of the Coastal Bays (Figure 57b) suggest that further research is warranted. Studies could include patterns of seasonal abundance, size-frequency and biomass; rock size preference (or other substratum characteristics); and seasonality, mechanism and rate of colonization of new riprap installations. Consideration should also be given to the benthic community effects of *Hemigrapsus sanguineus* as it appears to be superior space competitor and an effective predator. Fisherman at Indian River Inlet reportedly use locally collected *Hemigrapsus sanguineus* as bait for tautog fishing at the inlet jetties, and the possibilities of establishing and promoting a bait fishery for Asian shore crabs should be investigated.

Both *Codium fragile* and *Carcinus maenas* were less common and more restricted to the lower intertidal region. Especially large *Codium fragile* were found in on ropes in Chincoteague Bay marina. The most effective means of collecting *Carcinus maenas* for laboratory experiments has been subtidal traps (Epifanio 2003). We found green crabs only near the two major inlets, at Indian River Inlet and near Ocean City. Together these observations suggest that additional survey work for subtidal invasive species, especially near boat docks and marinas, should be considered.

References

Epifanio, C. 2003. University of Delaware, College of Marine Studies, Lewes, DE. Personal communication.

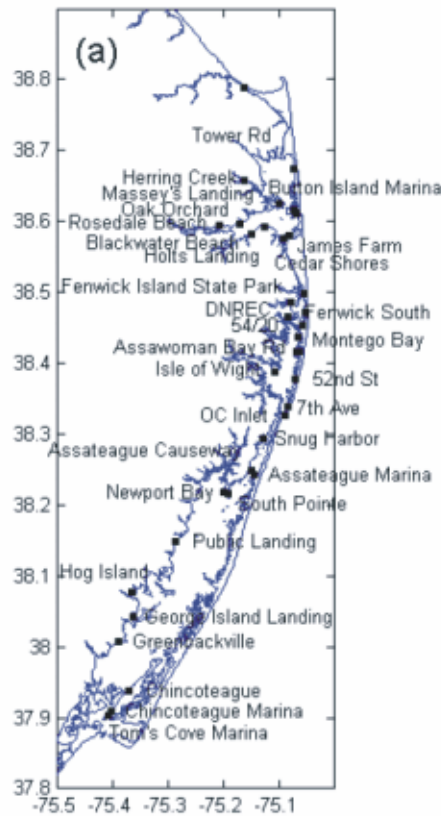


Figure 8.9.1: Coastline of Delaware and Maryland showing coastal and inland bays with locations of 38 intertidal survey sites.

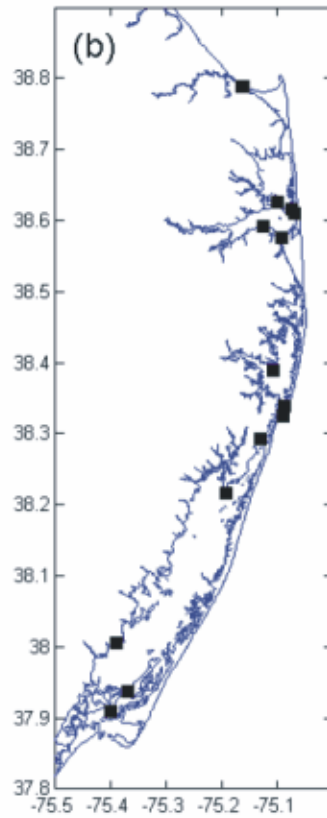


Figure 8.9.2. Occurrence of the Asian shore crab, *Hemigrapsus sanguineus*.

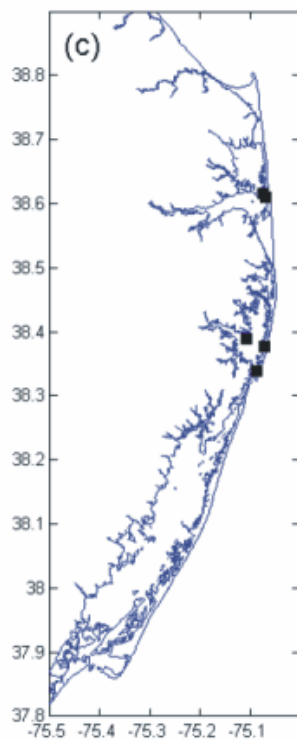


Figure 8.9.3. Occurrence of the European green crab, *Carcinus maenas*.

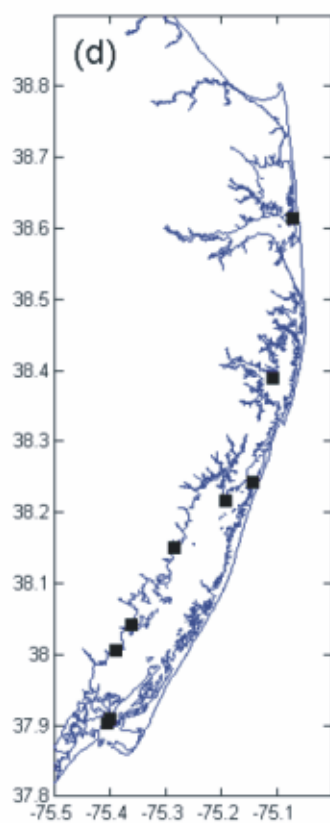


Figure 8.9.4. Occurrence of deadman's fingers macroalgae, *Codium fragile*.